

REMARKS

1. The specification is amended to correct a minor typographical error.
2. Figure 10 is amended to add the reference numeral 42 to the spring tensioner. Support in the specification is found at p. 8 l. 19.
3. Independent method claim 1 is amended to distinguish over the cited prior art. Dependent method claim 7 is amended for consistency with claim 1, and method claims 11 and 13 are cancelled. New dependent method claim 51, which depends from claim 1, is added. New independent method claim 54, which essentially contains the same limitations as amended claim 1, is added.
4. Independent apparatus claim 23 is amended to distinguish over the cited prior art. Dependent apparatus claim 25 is amended for consistency with claim 23. Claim 36 is amended from an independent apparatus claim to depend on claim 23. Dependent apparatus claims 24, 26, 34, 35, 37, 39, 41, and 42 are cancelled. New dependent apparatus claims 48-50, which depend from claim 23, are added. New independent apparatus claim 52, which essentially contains the same limitations as claim 23, is added. New dependent apparatus claim 53, which depends from new claim 52, is added.
5. Claims 1-3, 5, 7, 10-14, and 16 were rejected under 35 U.S.C. § 102(b) as anticipated by Finn et al. (U.S. 6,431,284). Independent claim 1 is therefore amended to more particularly claim the subject matter that the applicant considers as the invention. Specifically, as amended, claim 1 includes the limitation that the tendon porches are disposed below the waterline. The mooring tendons of Finn et al. are attached to table 28, which is clearly above the waterline. Fig. 1, col. 4 ll. 9-13. Table 28 is compliantly supported by springs 32 (col. 4 l. 11), such as

elastomeric load pads 58 and 60 (col. 4 ll. 54-56). The Finn et al. arrangement does not disclose or suggest locating the tendon porches below the waterline.

Claim 1 is also amended to require that the mooring tendons be non-compliantly connected to the hull. Finn et al. table 28 is compliantly supported by springs 32 (col. 4 l. 11), such as elastomeric load pads 58 and 60 (col. 4 ll. 54-56). Rigidly mounting table 28 to the vessel would undermine the objects of the invention outlined by Finn et al. (Col. 1 ll. 55-66).

Furthermore, claim 1 is amended to specifically claim the structure of a tension leg platform—a submerged hull with a keel, first and second vertical columns each having a lower end carried by the hull below the waterline and an upper end disposed above the waterline, and a deck carried by the upper ends of the columns. The platform is moored at first and second extremities (i.e., distal locations) of the hull. On the other hand, Finn et al. discloses a spar platform that consists of a single, large diameter vertical cylinder moored at the medially-disposed table 28.

Therefore, independent claim 1, claims 2-3, 5, 7, 10-14, 16 and 51 dependent thereon, and independent claim 54 are novel and patentably distinct over Finn et al.

6. Claims 1-7, 9-14 and 16 were rejected under 35 U.S.C. § 102(b) as anticipated by White, et al. (U.S. 5,147,148). Claim 14 requires the suspension of a tubular riser by a spring. The applicant respectfully disagrees with the examiner that White et al. discloses this limitation. The riser is suspended at 9 (Figure 1) or at 109 (Figure 5) by a porch 106 (Figure 5) (Col. 9 ll. 47-51), which appears to be rigidly connected to the platform. There is no disclosure or suggestion by White et al. of suspending production risers by a spring.

Independent claim 1 is amended to add the limitation of longitudinally suspending the production risers by at least one passive tensioner that allows vertical movement between each of the risers and the tension leg platform to compensate for lateral displacement of said tension leg

platform. White et al. does not disclose or suggest this limitation. White et al. teaches suspending production risers by porches 106, which are rigidly mounted to the platform structure. The risers are "connected to the floating structure under sufficient tension such as to also function as tendons to restrain heave of the floating structure in addition to functioning as conduits for hydrocarbon production." Col. 5 ll. 61-68. Mounting the production risers resiliently to the platform would defeat the stated purpose of tensioning the production risers to act as mooring tendons.

Claim 1 is further amended to require first and second vertically oriented mooring tendons connected to and terminating at the hull below the waterline at first and second distal extremities, respectively. The mooring lines used at the White et al. platform extremities are neither vertically oriented nor terminate below the waterline, and the production risers are not connected to porches located at distal extremities of the hull. Rather, the production risers, which act as mooring tendons, are connected to medially-disposed table 28. Figure 1.

Therefore, independent claim 1, claims 2-7, 9-14, 16, and 51 dependent thereon, and independent claim 54 are novel and patentably distinct over White et al.

7. Claims 23, 25, 26, 31, 32, 34-36, 39, 41, 42 and 45-47 were rejected under 35 U.S.C. § 102(b) as anticipated by Thomas (U.S. 6,406,223), and claims 24 and 37 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Thomas in view of Eie (U.S. 4,938,632). In response, independent claim 23 is amended to more particularly claim the subject matter that the applicant considers as the invention. Specifically, claim 23 is amended to include the limitation of first and second tendon porches located distally and below the sea level and vertically-oriented mooring tendons connected thereto. Thomas, on the other hand, discloses catenary mooring lines that are not vertically oriented.

Furthermore, claim 23 is amended to include the limitation of a passive resilient tensioner that longitudinally suspends a production riser from the deck, and which allows vertical resilient movement between the production riser and the TLP deck. Thomas teaches top-end hauling of production risers using an active compensator including hydraulic rams 70 carrying blocks and rigging (Figure 4; col. 5. ll. 10-27). The Thomas platform is a semi-submersible system moored with catenary lines that heave-restrain the platform to only a limited extent, with riser stroke commonly reaching 12 meters. Thus, Thomas does not suggest to one of ordinary skill in the art the use of passive resilient tensioners to support the production risers.

Therefore, amended independent claim 23, and claims 25, 30-32, 36, and 45-50 dependent thereon, are novel and patentably distinct over Thomas. Likewise, new claims 52-53 are novel and patentably distinct over Thomas.

8. Claims 23-26, 30, 31, 32, 34, 35, and 45-47 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Peterson (U.S. 4,657,439) in view of Eie, in that Peterson discloses a series of risers coupled about the interior moonpool perimeter of the hull, with the risers being laterally inserted into keel guides and tensioned by winches to allow vertical movement, and Eie shows a mooring.

Peterson discloses a method for coupling a riser or umbilical to a moored floating body having a hull with a keel, the method including the steps of operatively coupling a lower end of a tubular member to a subsea well, longitudinally suspending an upper end of the tubular member from a first elevation above the hull, and laterally supporting the tubular member at a second elevation at the hull. However, in Peterson, the lateral support is provided by a buoyant member 27 which slides up and down in a vertical cylinder 31 as the waterline shifts. The applicant's invention includes a lateral support that is fixed to the hull, and claim 23 includes a limitation of

a bearing assembly having a vertically oriented generally cylindrical passage for receiving a tubular member, the bearing assembly being *fixed to the hull*. Peterson's bearing assembly is buoyant member 27, which clearly is not fixed to the hull because it freely slides within buoyant member opening 31.

Peterson does not suggest the use of a fixed support, nor provide motivation therefor. "A method and apparatus therefore need to be developed that allows a riser to be passively tensioned by a buoyant member, without the inherent disadvantages mentioned previously in the use of such a member." Peterson col. 2 ll. 24-27. As Peterson requires a buoyant member, and suggests using only the buoyant member for support of the riser, Peterson does not provide motivation for a lateral riser support fixed to the hull.

Eie discloses a tension leg platform, which is well known in the art as a platform arrangement in which the long flexible mooring tendons allow significant side-to-side movement of the platform but essentially prevent any vertical movement of the platform. Eie col. 1 ll. 26-31. However, Eie does not disclose a lateral riser support that is fixed to the hull.

Paterson in combination with Eie fail to disclose every limitation of claim 23, namely a lateral riser support that is fixed to the hull. Where the references taken together fail to disclose all of the explicit limitations in a claim, a *prima facie* case of obviousness is not shown. *In re Grasselli*, 713 F.2d 731, 743, 281 USPQ 769, 779 (Fed. Cir. 1983). Therefore, claim 23, and claims 24-26, 30, 31, 32, 34, 35, and 45-47 depending thereon, are patentably distinct over with Paterson in view of Eie.

In summary, claims 1-7, 9, 10, 12, 14, 16, 23, 25, 30-32, 36, and 45-54 are pending in the application. As presented herein, these claims are believed to be new and unobvious over the

cited prior art. Applicant believes the application is in condition for allowance. Allowance of the claims and passage to issue is requested.

Respectfully submitted,



Brett T. Cooke
Reg. No. 55,836

Andrews Kurth LLP
600 Travis, Suite 4200
Houston, Texas 77002
713-220-3813 (office)
713-238-7163 (facsimile)
Customer No. 23,444

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Enc: Replacement Drawing Sheet with Figure 10